CLAIMS

What is claimed is:

1. A method of performing anisotropic mip-mapping, comprising:

mapping a target pixel needing texture to one or more texels in a higher resolution texture array, a region of support in the higher resolution texture array being defined by a long and a short axis and being generally elliptical and a level of detail being derived from the short axis; and

performing a filtering function along an axis using the texels from the higher resolution texture array to simulate a filtering effect of using texels from the higher resolution texture array and a second texel array having a lower resolution.

2. A method of performing anisotropic mip-mapping, as recited in claim 1, wherein the step of performing a filtering function includes:

using the texels from the higher resolution texture array to derive texels of the lower resolution texture array;

interpolating the texels from the higher resolution texture array to form a first blended texel;

interpolating the texels from the lower resolution texel array to form a second blended texel; and

interpolating the first blended and second blended texels to arrive at a texture for the target pixel.

3. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of using the texels from the higher resolution texture array to derive texels of the lower resolution texture array includes filtering adjacent texels in the higher resolution texture array, based on the mapped position of the target pixel in the higher resolution texture array, to derive texels in the lower resolution texel array.

4. A method of performing anisotropic mip-mapping, as recited in claim 3, wherein four adjacent texels in the higher resolution array are used to derive two adjacent texels in the lower resolution array.

5. A method of performing anisotropic mip-mapping, as recited in claim 4, wherein an adjacent pair of texels in the higher resolution array is filtered to provide a single texel in the lower resolution array.

6. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of using the texels from the higher resolution texture array to derive texels of the lower resolution texture array includes averaging adjacent texels in the higher resolution texture array, based on the mapped position of the target pixel in the higher resolution texture array, to derive texels in the lower resolution texel array.

7. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of interpolating the texels from the higher resolution texture array to form a first blended texel includes bilinearly interpolating adjacent texels based on the mapped position of the target pixel in the higher resolution texture array.

8. A method of performing anisotropic mip-mapping, as recited in claim 7, wherein a selected texel to which the target pixel is mapped and an adjacent texel are interpolated based on the position of the target pixel in the selected texel.

9. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of interpolating the texels from the higher resolution texture array to form a first blended texel includes forming the sum of a first product, $Uf * T_B$, and a second product, $(1\text{-}Uf)\ T_C$, where Uf indicates a coordinate position of the target pixel in the higher resolution texture array, and T_B and T_C are adjacent texels in the higher resolution array.

10. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of interpolating the texels from the lower resolution texel array to form a second blended texel

includes bilinearly interpolating adjacent texels based on the mapped position of the target pixel in the lower resolution texture array.

11. A method of performing anisotropic mip-mapping, as recited in claim 9, wherein a selected texel to which the target pixel is mapped and an adjacent texel are interpolated based on the position of the target pixel in the selected texel.

12. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of interpolating the texels from the lower resolution texture array to form a second blended texel includes forming the sum of a first product, m * T_{AB}, and a second product, (1-m) T_{CD}, where m = ½Uf + ¼ , which indicates a coordinate position of the target pixel in the lower resolution texture array, and T_{AB} and T_{CD} are adjacent texels in the lower resolution array.

13. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of interpolating the first blended and second blended texels to arrive at a texture for the target pixel includes bilinearly interpolating the first and second blended texels, based on a parameter that indicates the level of detail between and including the texels of the higher and lower resolution arrays.

14. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the step of interpolating the first blended and second blended texels to arrive at a texture for the target pixel includes forming the sum of a first product, (Df) * the first blended texel, and the second product, (1-Df) * the second blended texel, where Df is the parameter indicating the level of detail, wherein, when Df is 0, the level of detail corresponds to the lower resolution texel array, and when Df = 1, the level of detail corresponds to the higher resolution texel array.

15. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein a first number of texels are sampled in a first direction in the higher resolution array and a second number of texels are sampled in a second direction in the higher resolution array to form first blended pixels in the first direction and first blended pixels in the second direction, and to form

second blended pixels in the first direction and second blended pixels in the second direction, said first number being different from said second number.

16. A method of performing anisotropic mip-mapping, as recited in claim 2, wherein the target pixel color is blended according to the following function, target pixel color = ΣWSi*ColorSi, for i from 1 to the number of samples, wherein ΣWSi=1, for i from 1 to the number of samples, and WSi is a weighting function for the ith sample, and ColorSi is the blended color for the ith sample.

17. A method of performing anisotropic mip-mapping, as recited in claim 16,

wherein the blended color ColorSi of the ith sample is blended according to the following function, ColorSi = ΣWuv*Color(u,v), for u from 0 to 3, and v from 0 to 3, for the ith sample,

wherein Color(u,v) is a color corresponding to Wuv on the same mipmap level, ΣWuv=1, for u from 0 to 3, and v from 0 to 3, and Wuv is a weight coefficient for said Color(u,v).

18. A method of performing anisotropic mip-mapping, as recited in claim 17, wherein the weight coefficients are elements of a weight coefficient array,

$$W_{uv}=\begin{bmatrix} 0.25D_f(1-U_f)(1-V_f) & (1-0.75D_f)(1-U_f)(1-V_f) & (1-0.75D_f)U_f(1-V_f) & 0.25D_fU_f(1-V_f) \\ (1-0.75D_f)(1-U_f)(1-V_f) & (1-0.75D_f)(1-U_f)(1-V_f) & (1-0.75D_f)U_f(1-V_f) & (1-0.75D_f)U_f(1-V_f) \\ (1-0.75D_f)(1-U_f)V_f & (1-0.75D_f)(1-U_f)V_f & (1-0.75D_f)U_fV_f & (1-0.75D_f)U_fV_f \\ 0.25D_f(1-U_f)V_f & (1-0.75D_f)(1-U_f)V_f & (1-0.75D_f)U_fV_f & 0.25D_fU_fV_f \end{bmatrix}$$

, where Uf, Vf are position parameters in direction u and v, respectively, and Df is a fraction value of the level of detail.